

# Eukaryotic Genomes

## Chapter 19

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Concept 19.1 - Chromatin structure is based on successive levels of DNA packaging

Chromatin:

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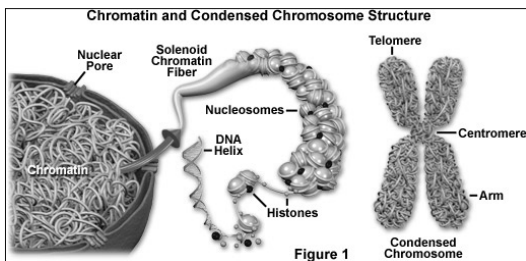
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## A. Levels of DNA packaging

### (1) Nucleosomes (10 nm fiber)

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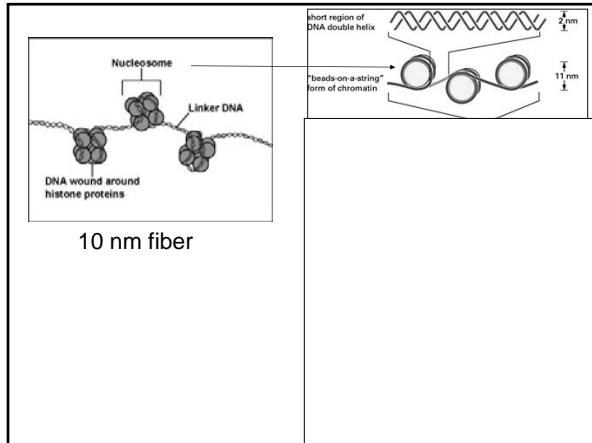
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### (2) 30nm fiber

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### (3) DNA loops (300 nm fiber)

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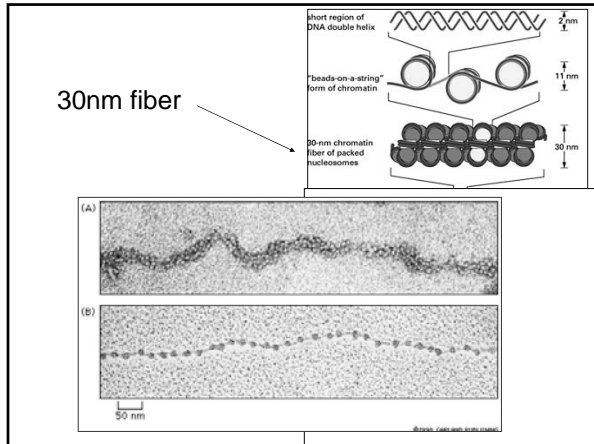
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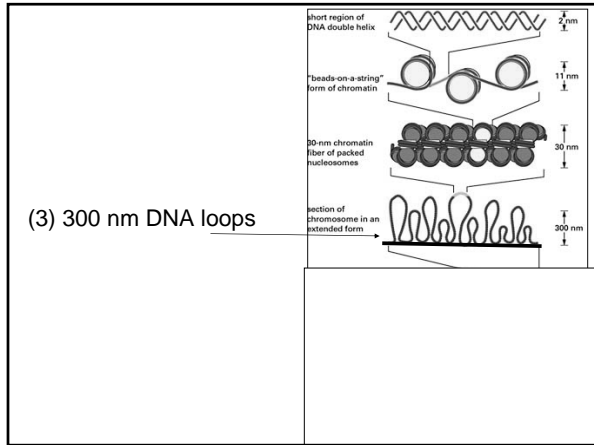
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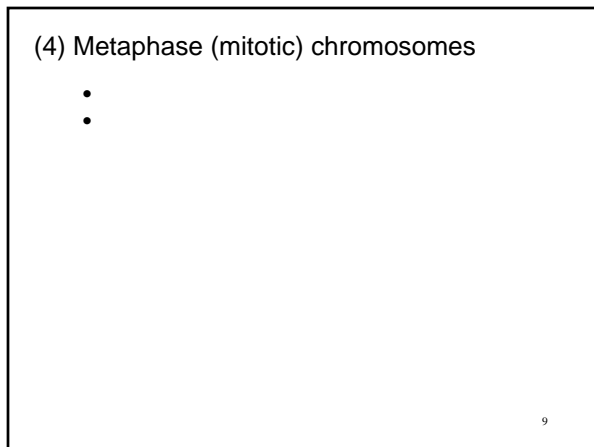
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Concept 19.2 - Gene expression can be regulated at any stage, but the key step is transcription

A. Differential Gene Expression

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Cell differentiation: Cells become specialized in their structure and function.

Differential gene expression:

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fertilized egg (zygote)



blastocyst



> 1 trillion cells (all with same genome)  
~ 200 different cell types

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## Gene regulation

- Regulation of Transcription
  - 1.
  - 2.
- Post-transcriptional regulation (not on test)
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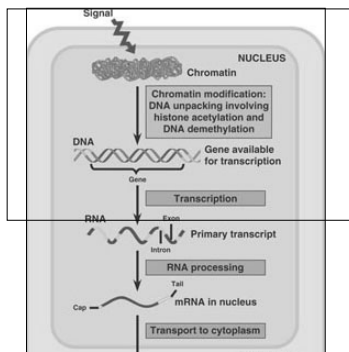
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## B. Modification of Chromosome Structure

- Acetyl groups ( $-\text{COCH}_3$ )-
  
- Methyl groups ( $-\text{CH}_3$ ) –

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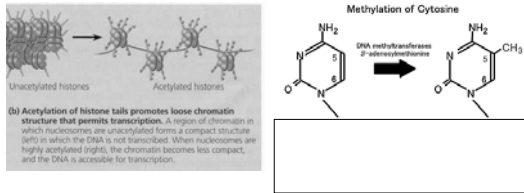
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Figure 19.4



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Question 19.1

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C. Regulation of Transcription Initiation

1. Eukaryotic gene structure

Upstream regulatory region

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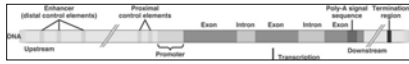
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Fig 19.5



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Enhancers:



Activators:

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## 2. Combinatorial control of gene activation

Transcription ("turning on a gene") requires binding of many activators

Albumin -  
Crystallin -

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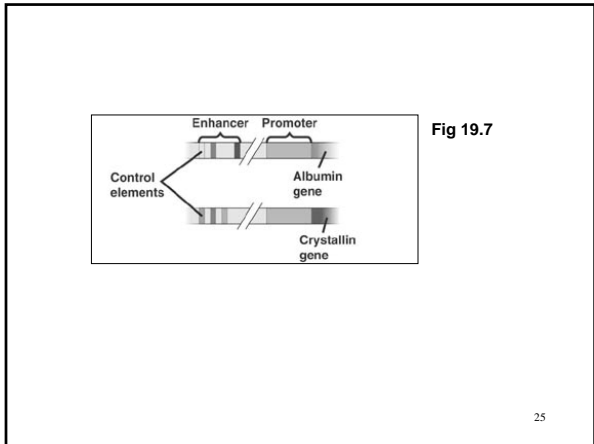
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Correct set of activators must be present to transcribe the gene.

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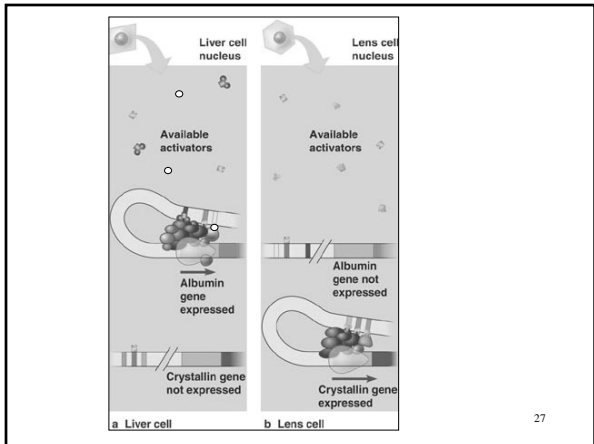
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